

$$1) s = 0.5t^2 \text{ m}$$

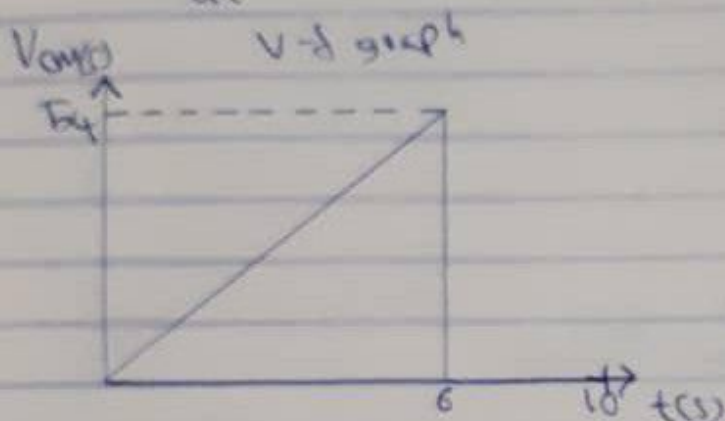
$$v = \frac{ds}{dt} = 1.5t^2 \text{ m/s}$$

$$\text{(a) } t = 6$$

$$v = 1.5(6)^2 = 54 \text{ m/s}$$

$$s_2 = 108$$

$$v = \frac{ds}{dt}; v = 0 \text{ m/s}$$



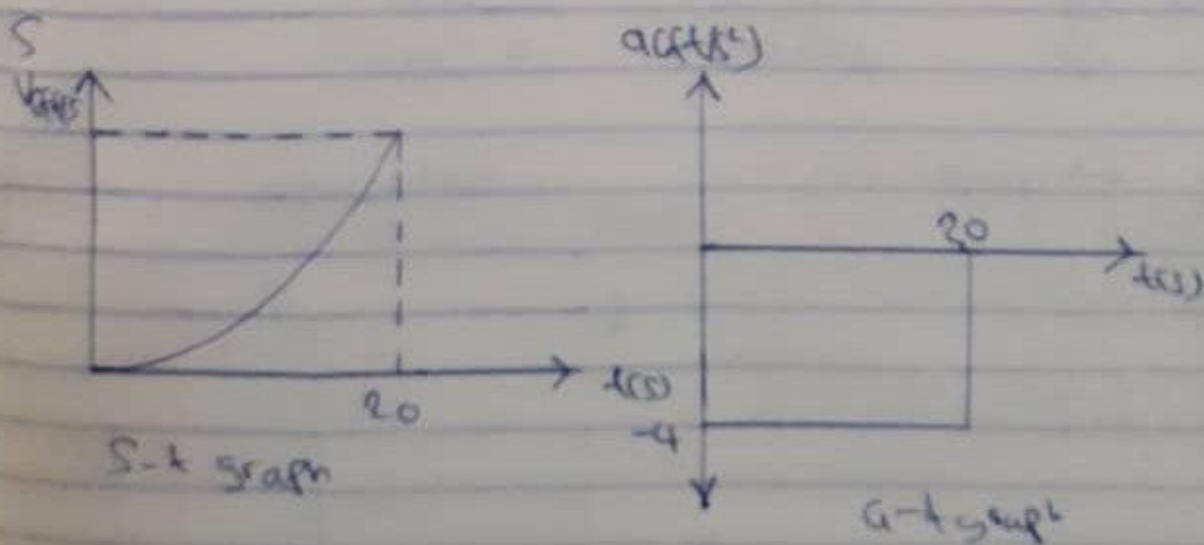
$$2) v = -4t + 80$$

$$a = \frac{dv}{dt} = -4 \text{ m/s}^2; \text{ @ } t = 20 \quad a = 4 \text{ m/s}^2$$

$$s = \int v dt; \int_0^{20} (-2t^2 + 80t) dt$$

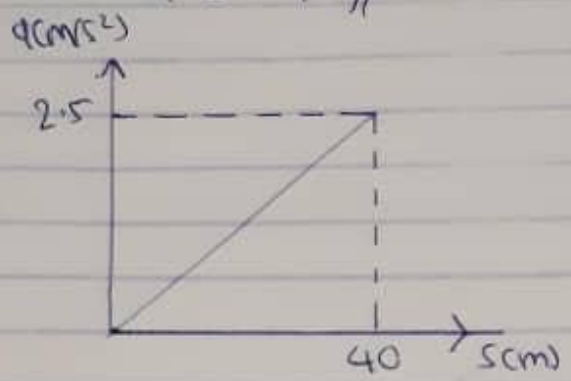
$$s = (-2(20)^2 + 80(20)) - (-2(0)^2 + 80(0))$$

$$s = 800 \text{ m}$$



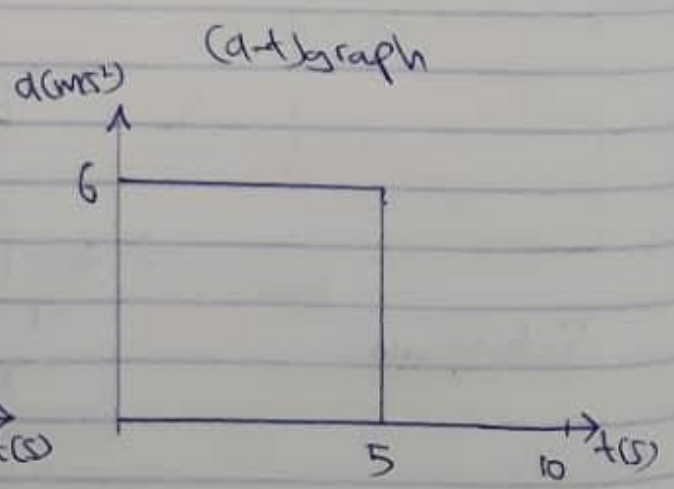
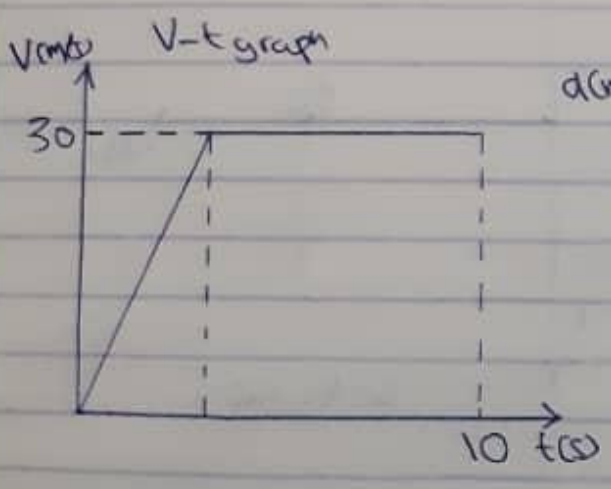
3  $v = 0.25s$   
 $a = v \left( \frac{dv}{ds} \right)$  ;  $a = 0.25s (0.25)$

$a = (0.0625s) \text{ m/s}$   
 @  $s = 40 \text{ m}$   
 $a = (0.0625(40))$   
 $a = 2.5 \text{ m/s}^2$



4  $s = 3t^2$  ;  $s = 30t - 7t$   
 $v = \frac{ds}{dt} = 6t$  ;  $v = \frac{ds}{dt} = 30 \text{ m/s}$   
 @  $t = 5$  ;  $v = 30 \text{ m/s}$   
 $v = 6(5) = 30 \text{ m/s}$

$a = \frac{dv}{dt}$  ;  $v = 6t$  ;  $v = 30 \text{ m/s}^2$   
 $a = 6 \text{ m/s}^2$  ;  $a = 0 \text{ m/s}^2$



$$5 \quad a = 20 \text{ m/s}^2 \quad a = -10 \text{ m/s}^2$$

$$\int dv = \int a \cdot dt$$

$$\int_0^v dv = \int_0^t 20 \cdot dt$$

$$v = 20t$$

$$\textcircled{a} \quad t = 5 \text{ s}$$

$$v = 100 \text{ m/s}$$

$$\int_{100}^v dv = \int_5^t -10 \cdot dt$$

$$v - 100 = -10(t - 5)$$

$$v - 100 = -10t + 50$$

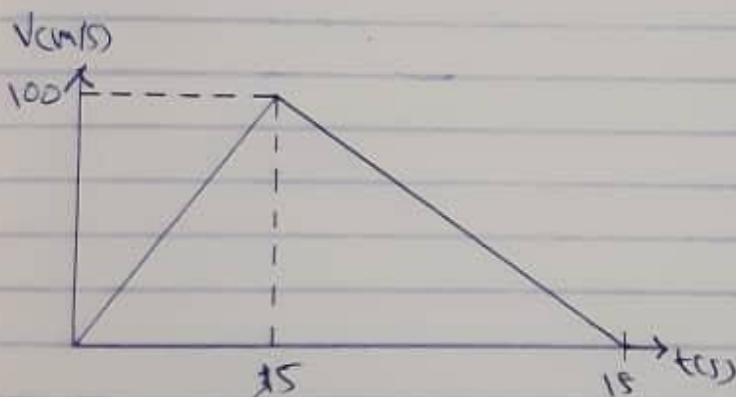
$$v = (-10t + 150) \text{ m/s}$$

$$\textcircled{a} \quad v = 0$$

$$0 = -10t + 150$$

$$-150 = -10t$$

$$t = 15 \text{ s} \quad (\text{time for car to come to rest})$$



6

$$v = 30t$$

$$s = \int v dt = (15t^2)'$$

$$\textcircled{a} \quad t = 5$$

$$= 15(5)^2$$

$$= 375 \text{ m}$$

$$v = -15t + 225$$

$$s = \int v dt = -7.5t^2 + 225t$$

$$\textcircled{a} \quad t = t_2 - t_1 = 15 - 5 = 10$$

$$\textcircled{a} \quad t = 10$$

$$-7.5(10)^2 + (225)(10)$$

$$= 1500 \text{ m}$$

$\therefore$  total distance travelled

$$= 375 + 1500 = 1875 \text{ m}$$

S(m) ↑  
1875

375

$15t^2$

$7.5t + 200t$

5

15

t(s) →

S-t graph

